

Millennium Challenge Corporation

Guidelines for Economic and Beneficiary Analysis

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MILLENNIUM
CHALLENGE CORPORATION
UNITED STATES OF AMERICA

Guidelines for Economic and Beneficiary Analysis

A. Background

The Millennium Challenge Corporation (MCC) was established in January 2004 to promote sustainable growth and poverty reduction. Indeed, the legislation that created the new American foreign assistance agency states that the MCC is to “(1) ... *provide United States assistance for global development ... and (2) to provide such assistance in a manner that **promotes economic growth and the elimination of extreme poverty and strengthens good governance, economic freedom and investments in people.***”¹

MCC’s overriding objectives of promoting economic growth and reducing poverty in our partner countries are closely connected. Evidence shows that the countries that achieved significant poverty reduction in recent decades also achieved significant economic growth. This strong relationship exists because economic growth is about income generation and, especially in poorer countries, the lack of income generation is one major reason behind chronic poverty.²

MCC does not simply assume that programs that stimulate growth will invariably reduce poverty, but instead looks at the likely distributive effects of proposals and, where possible, identifies the likely beneficiaries and the program’s impact on poverty. Ultimately, MCC seeks to fund activities that will generate significant and measurable increases in incomes of large numbers of people in our partner countries, including significant gains for the poor.

MCC analyzes the likely impact on economic growth of its programs by analyzing whether the proposed programs are consistent with international evidence on drivers of economic growth and by use of **Economic Rate of Return Analysis (ERR)**.³ The essence of such an analysis is a straightforward comparison of costs and benefits, where the costs are the MCC-funded grants and the benefits are increases in incomes in recipient countries. Thus, MCC analyzes proposals as investments, with payoffs going to households and firms in partner countries.

The ERR analysis provides an estimate of the total increase in incomes attributable to a proposed MCC-funded activity relative to the total costs. Evidence from past work by MCC and others demonstrates a strong correlation between the amount of total benefits generated by an investment and the total amount of benefits gained by low-income households. The estimated increase in total incomes generated as part of the ERR analysis, however,

¹ Millennium Challenge Act of 2003, Section 602.

² Many studies have investigated the relationship between economic growth and poverty, and while MCC does not favor any particular one, readers interested in evidence from the 1990s may consider “Pro-poor Growth in the 1990s: Lessons and Insights from 14 countries,” available online at http://siteresources.worldbank.org/INTPGI/Resources/342674-1119450037681/Pro-poor_growth_in_the_1990s.pdf.

³ Readers may be familiar with benefit-cost analysis, and ERR estimates represent a summary statistic that reflects the economic merits of a proposed investment. A project is considered a sensible economic investment when the estimated ERR is higher than the local discount rate for capital. In most developing countries, one would expect that discount rate to be near or above 10%.

does not distinguish among different types of beneficiaries and so cannot describe with precision the impact of a proposed project on the poor or any other specific population group. **Beneficiary Analysis** is an extension of ERR Analysis that seeks to *disaggregate* the total increase in income to determine specifically *which segments of society* will benefit from the proposed activities. Beneficiary Analysis can shed light on the merits of proposed investments in terms of promoting significant reductions in poverty. In selecting among several potential investment options, Beneficiary Analysis may provide important information to help identify preferred alternatives.

As a general objective, MCC policy is to seek proposals with high economic rates of returns and broad impact; in many cases, investments with high returns may also *reduce* inequality, enhancing the impact on poverty.⁴ We seek programs with both high poverty reduction impact and high economic returns at the same time, rather than one or the other, and this approach excludes projects that promise high returns but do not benefit the poor. Country partners are expected to identify crucial constraints to growth and consider possible investments to ease those barriers to growth. MCC requires that countries analyze the economic impact of several options and select those proposals and project designs that have the highest impact on economic growth and poverty reduction for submission to MCC. The analysis of options and selection from these options should be part of the consultative process.

MCC's policy implies no preference over sectors and the use of economic rate of return analysis does not necessarily favor any particular sector, such as infrastructure, agriculture or health. Many of the projects proposed to MCC have been in agriculture and infrastructure, leading some to conclude incorrectly that MCC favors projects in these areas. In fact, MCC has no preference for sector or region, and a premature focus on one part of the country or economy may lead country partners to miss the potential investments that promise the highest return in growth and poverty. MCC's ERR analysis considers income gains over a relatively long term, typically 20 years, and so can capture the returns to investments in health and education that may accrue over a relatively extended period. To underline this point, Annex 1 describes three examples of health and education projects with high economic returns. In every case, however, the economic rationale needs to be assessed with a comparison of the cost of a proposed activity and the projected impact on local incomes.

MCC's policy of country ownership means that, through a consultative process, countries have the lead in proposing how funds should be used. MCC respects the ability of the country to analyze its own impediments to growth, and expects that governments will analyze options jointly with a wide array of stakeholders. MCC views its relationship with the countries as a partnership dedicated to the shared goal of determining where MCC funds can have the highest impact in raising incomes and fighting poverty. MCC reserves the right, however, to withhold approval for a proposal or parts of a proposal based on, among other factors, evidence of technical infeasibility, low

⁴ Although MCC's primary objective is reducing poverty through growth, the impact on equity is a related and important consideration. It is possible that a high-return project could increase inequality but still deliver large amounts of income to the poor; it is also possible that a project targeted to the poor could reduce inequality but, because of low returns, deliver few benefits to the poor. The Beneficiary Analysis should help program planners avoid both of these outcomes, recognizing that poverty impact is driven by the total *amount* delivered to the poor.

economic returns (i.e., low *net* returns), weak supporting assumptions, low poverty reduction impact, or the lack of clear measurable benchmarks.

A number of studies have confirmed the tendency of analysis to be overly optimistic about project benefits before a project begins; for this reason, MCC prefers that evidence about a project's impact be drawn from evaluations of similar completed projects in the compact country or, if this is not available, results from another country with similar economic characteristics and conditions may be applicable. In keeping with our focus on results, MCC will not approve proposals or parts of proposals without good supporting evidence that the proposal will have a significant impact on economic growth and poverty reduction. Such evidence should be available when a country's proposal is presented to MCC.

In addition, MCC will come to agreement with the country on targets and a monitoring plan for each activity before the program commences. The M&E framework is directly linked to the economic analysis since variables from the benefit stream of the ERR analysis are included as key performance indicators and targets in the Monitoring and Evaluation Plan (M&E Plan). The purpose of this approach is to ensure that monitoring focuses on what is essential to producing a high economic impact. Since disbursements of MCC assistance will be conditioned on achieving benchmarks linked to the economic analysis, overly-optimistic economic projections are not recommended. The monitoring plan may also specify mid-stream changes in activities if the benchmarks are not being met. (See Guidelines for Monitoring & Evaluation Plans for more detailed information.)

B. Guidance on calculating Economic Rates of Return (ERRs)

The economic justification for any proposed investment is assessed by comparing the likely benefits of that investment to total costs required to successfully implement the activity. This approach is similar to that taken by private sector firms when they decide whether to invest funds in a new for-profit venture, except public sector assessments consider the impact on a broader set of individuals (e.g., the country's entire population). As a public agency considering the likely benefits for its partner countries, MCC focuses on *micro-economic growth analysis* that estimates the expected increase in either incomes of people or value-added⁵ by individual firms in the country.⁶ This increase in incomes or value-added reflects the improvement in standards of living in partner countries that is MCC's primary goal; the distributional impact of these investments is formally considered in the Beneficiary Analysis (described below). The analysis of costs includes the MCC investment and any costs borne by local individuals or organizations.

⁵ Value-added is defined as total revenues minus the cost of intermediate inputs. It is the measure of the economic output of an enterprise that is used in national income accounting. The value-added of each firm flows back into the hands of the firm's individual owners and employees in the form of profits and wages.

⁶ When proposals are not amenable to micro-economic growth analysis (as might be the case, for example, in policy reforms that are national in scope), MCC seeks to measure the impact by regression evidence from other countries or cross-country regression analysis or by use of simulations based on realistic assumptions.

A cash-flow analysis captures the value of the benefits relative to the value of these costs, but these net flows need to be discounted over time to reflect the opportunity cost of capital and the normal time-preference that people have for benefits sooner rather than later. The ERR, which is used as a summary statistic to describe the economic justification for the proposed investment, can be understood as the discount rate at which benefits exactly equal the costs of the proposed project.⁷ The higher the value of the benefits relative to the costs, the higher the ERR. Similarly, benefits that accrue sooner relative to the time when costs are incurred will also generate higher ERRs than projects with the same amount of benefits that accrue further in the future. In this sense, the ERR is a robust measure of a project's impact on the material standards of living in the partner country that takes into account the absolute amounts of costs and benefits and the pattern of both over time.

The with-project scenario is compared to a scenario in which the investment is not made, known as the *counterfactual*. This baseline for comparison should be as realistic as possible, capturing what is most likely to happen in the absence of the new investment. In this scenario, the funds used for the investment are devoted to other undertakings, thus generating some return. In the MCC context, the average rate of return that these funds are likely to earn is the average return on such funds in the partner country as a whole, captured by "hurdle rates" that reflect the most recent growth rates in the country. Investments in activities that promise lower returns can be seen not just as a sub-optimal choice, but rather as an inefficient allocation of capital for the economy that may lead to distortions that will slow rather than accelerate growth.

Estimating the costs of a proposed project is relatively straightforward, as these primarily depend on the project's design. Estimating project benefits is somewhat more complex, since a counterfactual scenario must be estimated to understand the project's impact. Outlined below are the four key steps used to estimate the ERR based on MCC's micro-economic growth focus. Briefly, these steps entail defining who the project will affect, what these individuals or firms' current income is and how it is likely to change in the absence of the project, estimating how their income is likely to change *with* the project, and finally comparing the two flows of income by calculating the ERR.

The following provides further details on each of these four steps:

I. Define the intended beneficiaries and the set of actions that are necessary and sufficient to achieve the projected increase in incomes.

A. One should begin by specifying the expected scope of the project's benefits, determining who is likely to benefit from the project. MCC considers beneficiaries of projects to be *those people who experience*

⁷ In such an analysis, an ERR of 0% does not describe a project whose costs and benefits are equal, but rather a project whose costs and benefits are equal only if capital has no opportunity or time cost. In traditional benefit-cost analysis, the net present value of an investment is positive if the ERR is higher than the discount rate. For public sector investments, identifying the correct discount rate is often problematic. In the field of international development, discount rates of 10-12% are commonly used; MCC's country-specific hurdle rates, falling between 10-15%, are consistent with this industry standard.

better standards of living as a result of the project through higher real incomes. These beneficiaries include owners and employees of firms whose value-added is expected to increase due to the project.

- B. MCC has found it useful to classify projects according to their scope to help predict the number and type of beneficiaries for different projects. MCC uses the following categories:
- ◇ *National or Regional Investments* are large-scale infrastructure projects that are expected to affect broad geographical areas of an economy, making *all* citizens in these areas beneficiaries.
 - ◇ *Broad-Based Investments* are other large-scale investments whose beneficiaries are typically counted as users of the new or improved public systems or those who will benefit from the use by others.
 - ◇ *Targeted Projects* include all other activities that benefit specific individuals and households, such as projects that focus on agricultural development, school construction or other educational development efforts.
- C. MCC policy is to obtain household survey data for assistance in quantifying the impact on beneficiaries as soon as possible. Such information is essential to understand who is likely to benefit from the activity and what the magnitude of the benefit is likely to be for these individuals.
- D. The impact on incomes of each intervention should be considered separately. Only when there is solid evidence of strong complementarities among the returns to these activities can multiple activities be combined into one model. For example, agriculture projects often are composed of a number of separate activities (e.g., technical assistance to farmers, rural roads, cold storage). Each activity should be considered separately to determine whether the specific activity generates sufficient impact to justify its costs. Although program designers sometimes suggest that a set of activities are jointly necessary to boost exports and incomes of households, this assertion that each and every component is truly necessary needs to be critically assessed.
- E. Projects must have a strong rationale for public sector involvement, such as the provision of public or quasi-public goods or services or the presence of important market failures (e.g., demonstrable information asymmetries or coordination problems, supported by evidence).⁸ When the gains from a project are large and concentrated among relatively few actors, the analysis should examine why such actors cannot undertake the investment without MCC funds. The ERR model for the proposed project must either

⁸ **Public goods** are goods or services that can be consumed by several individuals simultaneously without diminishing the value of consumption to any one of the individuals. This key characteristic of public goods, that multiple individuals can consume the same good without diminishing its value, is termed **non-rivalry**. Nonrivalry is what most strongly distinguishes public goods from private goods. A pure public good also has the characteristic of **non-excludability**, that is, an individual cannot be prevented from consuming the good whether or not the individual pays for it. For example, fresh air, a public park, a beautiful view, national defense.

explicitly incorporate an analysis of the incentives of these individual actors or be accompanied by an explanation of the rationale for public sector involvement that includes documented evidence.

II. Gather data on *current* incomes or total value-added of the intended beneficiaries and estimate how these are likely to change *without* the project over time.

- A. The assessment of what will happen *without* the program should estimate what will *most likely* occur, not what is desired or what will occur under the best circumstances. When estimating what will happen in the absence of the program, the standard assumption should be that recent past practices will prevail. If production trends have been trending upwards, the without-program scenario should reflect this rising baseline rather than a no-growth assumption.
- B. MCC's standard practice is to study projects over a 20-year time horizon. When there is strong evidence that the useful life of the MCC investment is shorter or longer than 20 years, such adjustments to the time horizon should be made, but noted explicitly and explained in the accompanying text. In all cases, analysts need to study the sustainability of investments over such time periods, including the probability that necessary maintenance will be completed. The analysis may vary the time period over which the ERR is calculated to determine the sensitivity of the estimated returns to the time horizon. When the magnitude of the economic returns is sensitive to the time horizon, this should be noted explicitly, as well.
- C. The analysis may estimate benefits as value-added or incomes. GDP can be measured in several ways: by summing value-added over all enterprises in the economy, or by summing incomes over all legal entities (e.g., wages or labor income of households, profits). Both methods are equally valid. For agriculture projects, country and MCC analysts may find it convenient to work with household incomes as the unit of analysis; for other projects, value-added of groups of enterprises or of a region of the country may be more convenient.

III. Estimate how incomes or total value-added of firms will increase *with* the project over the same time horizon.

- A. The primary goal of this step is to identify the economic logic through which the project activities lead to higher incomes or value-added and estimating the magnitude of this effect using reasonable estimates from country-specific data or other experiences in other relevant, comparable contexts.
- B. In keeping with the focus on economic growth, and in recognition that data are often scarce in MCC countries, economic analysis should focus on forecasting increases in incomes or value-added from projects and exclude consumer surpluses or other economic rents.⁹

⁹ Important rent transfers should be noted elsewhere in the analysis when seen to be significant.

- C. When the project relies on individuals or firms making decisions, such as investing, changing economic behavior, or participating in a publicly funded program, a financial analysis should be performed from the perspective of these actors to confirm that they have a financial incentive to perform those actions, with proper accounting of their opportunity costs. For example, when a project upgrading an irrigation system relies on farmers cooperatively maintaining newly purchased equipment, the analysis should explicitly consider what an individual farmer's income is likely to be if he or she invests in maintenance and what will happen to the project if those investments do not take place.
- D. Projects should not be undertaken if the positive economic benefit hinges on the presence of a tax or subsidy. Therefore, economic analysis should use shadow prices whenever possible. Shadow prices are the market prices that would prevail in the absence of taxes, subsidies or administrative restrictions on market activity.
- E. Demand multipliers generally should not be used in ERR analysis, unless: (a) the region of the project has significant excess capacity; and (b) there is prior empirical evidence that these effects are significant. MCC will seek to gather its own evidence on the magnitude of demand multipliers for use in future estimates of the economic returns. MCC is aware that most guidelines on cost-benefit analysis recommend approaching claims of large multipliers critically, and is wary of projects whose economic rationale relies on the assumption of large unidentifiable benefits.

IV. Construct a cash-flow analysis and estimate the ERR

- A. A cash-flow analysis should be compiled in a spreadsheet, in which the project costs over time are negative entries and the net incomes or value-added (i.e., the difference between II and III, above) represent the projected benefits. These should be laid out on a year-by-year basis for the project's time horizon, normally 20 years (as detailed above).
- B. When calculating the costs of using productive resources, such as labor, land and capital, such resources should be expected to be used in their best alternative activity. In other words, the concept of opportunity costs should be used in evaluating the costs of using resources.¹⁰ For example, when analyzing a project that creates new jobs in the economy, it is usually incorrect to assume that the individuals who will be employed in these jobs would otherwise have been earning no income. Instead, the opportunity cost of labor should be estimated, usually as a weighted average of the wage rates in the formal and informal sectors, adjusted by the overall unemployment rate. The wage benefit from the new jobs can be estimated as the difference between the wages paid and the opportunity cost of labor.
- C. Important environmental and social benefits, costs, and risks of projects should be listed and quantified where possible.

¹⁰ The opportunity cost is the highest valued alternative foregone in the pursuit of an activity.

- D. The analysis should look at growth in *real* incomes adjusted for expected inflation. Both costs and benefits should be expressed in terms of either local currency or U.S. dollars in the same base year (e.g., “2009 dollars”).
- E. Once all of the year-by-year costs and benefits have been incorporated, the ERR can be calculated as a single summary statistic over the project’s time horizon. Again, the ERR is the discount rate at which the discounted benefits equal the discounted costs.
- F. Sensitivity analysis should also be conducted, using variance decomposition or other tools to identify the key parameters driving the returns. The analysis should also focus on those parameters or assumptions for which the evidence is weakest and those which have the largest impact on ERR point estimates.
- G. The spreadsheet should be accompanied by a text document that explains the underlying economic rationale for the project, addresses each of the key points mentioned above, and provides any supporting evidence, such as citations of studies in which the key parameters used in the ERR calculation had been estimated.

B.1. Minimum Standards for ERRs

MCC recognizes that the assumptions involved in any ERR analysis introduce a considerable degree of uncertainty and, as noted above, that *ex ante* expectations may not be matched by *ex post* observations. MCC is aware that other donors have hurdle rates for many of their projects, and has reviewed the reported experience of others, as well as the *ex ante* expectations for the programs and projects it has financed to date. MCC has an active interest in both attracting private sector investment and coordinating with other donors, and seeks to avoid “crowding out” other sources of funding.

Against this background, the minimum acceptable ERR for both programs and individual components of MCC compacts will be the greater of: (a) two times the average real growth rate of GDP for the country for the most recent three years for which data is available; or (b) two times the average real growth rate of GDP for all of the MCC eligible countries for each country for the most recent three years for which data is available.¹¹ The minimum acceptable ERR shall not be greater than 15 percent. This minimum acceptable ERR is not subject to adjustment for other factors in or effects of the components or programs, and should be viewed as a true minimum. MCC should seek to fund the projects and activities with the highest rates of return achievable from those arising from the priorities identified in the country’s consultation process.

¹¹ The hurdle rates will be set once a year, in November after country selection, using the data available in the September edition of the IMF’s *World Economic Outlook Database* for the three previous years.

In rare instances, MCC reserves the discretion to proceed with projects that fall below the minimum acceptable ERR. Thorough justification would be required, based on the unique circumstances of any such proposed case for the application of this discretion, but it is expected that country partners share the understanding that MCC funds are to be viewed as investments of public funds that must earn a minimum return for the country's citizens.

C. *Guidance on Conducting Beneficiary Analysis (BA)*

In proposing projects for MCC funding, partner countries should develop a **Beneficiary Analysis (BA)** that describes the expected project impact on the poor and other important demographic groups. The BA should answer three basic inter-related questions:

- A. *Beneficiaries*: How many people are expected to benefit from increased household incomes as a result of the project, and what proportion of them is poor?
- B. *The Magnitude of Benefits*: How much, on average, will each individual beneficiary gain from the project?
- C. *Cost Effectiveness*: For each dollar of MCC funds invested, how much will be gained by the poor?

This BA should reflect the outcome of an iterative project design process that incorporates considerations of impact and distribution. Ultimately, both the total amount of benefits (reflected in the ERR) and the distribution of those benefits (reflected in the BA) are crucial elements of MCC's economic analysis. A Beneficiary Analysis example is shown in Table 4, Annex 2.

C.1. Terminology

Classifying beneficiaries as poor or non-poor requires first defining beneficiaries and poverty. As stated earlier, *MCC considers beneficiaries of projects to be those people who experience better standards of living as a result of the project through higher real incomes.* These beneficiaries include owners and employees of firms whose value-added is expected to increase due to the project. Some projects may affect large numbers of people, but only a portion of these individuals will realize higher incomes or lower expenditures. For example, a training program may have many participants, but only some of these will adopt new practices and experience higher incomes. The BA should focus on beneficiaries who realize income gains or expenditure savings, but can also include a separate discussion and tabulation of other individuals who realize only non-monetary benefits.

Consistent with standard poverty measurement practices, MCC considers the household the most practical unit of measurement, which reflects the underlying assumption that when one household member earns additional

income, all household members benefit. As such, *MCC defines and counts as beneficiaries all members of households that have at least one individual who realizes income gains.*¹²

In defining poverty, MCC generally uses the following poverty lines to classify beneficiaries:

Poverty Category	Per capita daily consumption (PPP adjusted) ¹³
“Extremely Poor”	< \$1.25
“Poor” ¹⁴	< \$2.00
“Near Poor”	\$2.00 – \$4.00
“Not Poor”	> \$4.00

Most countries can be expected to have official poverty lines that differ from these international lines. The BA may consider the distributional implications using national lines, but such calculations should be used in addition to (not instead of) the income categories described above.

C.2. Counting Beneficiaries

As detailed on page 4, MCC has found it useful to classify projects according to their scope to help predict the number and type of beneficiaries for different projects. MCC uses the following categories:

- ★ *National or Regional Investments* are large-scale infrastructure projects that are expected to affect broad geographical areas of an economy, making *all* citizens in these areas beneficiaries.
- ★ *Broad-Based Investments* are other large-scale investments whose beneficiaries are typically counted as users of the new or improved public systems or those who will benefit from the use by others.
- ★ *Targeted Projects* include all other activities that benefit specific individuals and households, such as projects that focus on agricultural development, school construction or other educational development efforts. For such projects, MCC counts as beneficiaries all members of those households that experience higher incomes.

¹² This analytical approach assumes that higher household income leads to higher consumption levels for all household members, but does not assume that all household members benefit equally. This assumption is consistent with evidence that the welfare of household members of all types improve as household income rises.

¹³ Best practice suggests using household consumption data to classify poverty ratings. In some cases where accurate consumption data may be difficult to obtain, income measures may be useful substitutes with appropriate adjustments. Purchasing power parity (PPP) adjustments are made in terms of 2005 international dollars, consistent with the World Bank’s most recent estimates of poverty lines in developing countries.

¹⁴ The “poor” category of beneficiaries includes the “extremely poor,” as there is little practical use for statistics referring to those consuming *between* \$1.25 and \$2 per day. As a result, however, the entire population is included in the three groups: poor, near poor, and not poor.

For many projects, the project development process will produce information on the population of likely beneficiaries, including administrative data from existing public or private systems, such as school enrollments, agricultural extension records, and water authority customer accounts. Together with the designed capacity of a project, such data may suggest the number of individuals who are expected to “receive treatment” through the program.

In some cases, the project design and budget will not limit participation to a fixed number of individuals, nor will administrative or other data provide an adequate estimate of the actual number of individuals expected to receive treatment from a project (e.g., road projects). Upgrading a section of highway does not in itself limit the number of vehicles travelling on the road. Vehicle counts combined with the HDM-IV model may allow a reasonably accurate estimate of the number of vehicles expected to travel on the improved road. However, road projects are expected to benefit a wider set of individuals beyond those travelling on the roads themselves; as such, all households living within a certain distance of the improved roads are likely to benefit. Where available, a recent census or other survey dataset may therefore be useful in estimating the number of individuals who will benefit from a project.

C.3. Estimating the Incidence of Benefits for National/Regional and Broad-Based Investments

After estimating the total number of beneficiaries, the BA should assess the share of beneficiaries by income category. The best approach is to use survey results to determine current participation in similar activities or the likelihood that particular individuals might benefit from broad-based initiatives.¹⁵ The Preliminary BA need not involve first-hand analysis of these data, but should be based on reports and existing evidence derived from them. When these are not available, other sources may be used to estimate the participation of the poor in the project.

The benefits that each individual is expected to receive from the project should be driven in part by the ERR model, which calculates the total benefits accruing to all segments of society. MCC expects that most national or regional investments, such as primary roads, may have significant but diffuse effects on household incomes throughout the relevant geographic area (these investments are either national or regional in scope). Because such investments do not generally alter the “rules of the game” that drive distributional outcomes, the BA should presume that additional income generated by these investments will be distributed consistent with the existing pattern of household incomes within the relevant geographic boundaries of beneficiaries.¹⁶

For MCC investments in public services, such as water and sanitation infrastructure, the analysis might begin with data reflecting the composition of existing users of this infrastructure. These numbers might then be adjusted to

¹⁵ Such data are generally available from existing sources, such as reports based on national household income and expenditure surveys, agricultural or enterprise surveys, Demographic and Health Surveys (DHS), or World Bank-supported Living Standards Measurement Surveys (LSMS).

¹⁶ If the population living under \$2 per day accounts for 25% of national consumption expenditures, that same population could be expected to gain 25% of the benefits of a distribution-neutral investment.

reflect any information that would suggest that the poor are more or less likely to use newly built, expanded or upgraded infrastructure.

C.4. Estimating the Incidence of Benefits for Targeted Projects

For targeted projects, the existing participation of the poor in similar activities can often be used to predict the likely profile of participants in MCC programs. Consider the example of a Vocational Education project that will improve the quality of education at technical schools located in the major cities and will offer new scholarships for low-income students. The composition of existing graduates of vocational education in the country's urban areas might be used to describe the expected profile of new students, with an adjustment for the number of additional poor students that will participate as a result of scholarships.

The share of benefits accruing to the poor can vary based on both the participation rates of the poor and the magnitude of the benefits relative to one's initial poverty level. For example, a vocational education program may yield a 10 percent gain in annual income for graduates of the program; even if poorer students are expected to realize higher than average gains in percentage terms, they might still experience smaller absolute gains. The incremental changes in income for beneficiaries at different levels need to be realistic and consistent with results produced by similar activities in other contexts.

C.5. Disaggregation by Important Demographic Categories

The BA is designed to focus largely on a proposed project's impact on the poor, consistent with MCC's stated mission to reduce poverty through economic growth. Although national and broad-based investments are not expected to substantially alter the distribution of income both across and within households, targeted program interventions are more likely to differ significantly in the distribution of benefits across other important demographic categories. Gender is discussed as a special case, followed by a more general consideration.

C.5.1. Disaggregation by Gender

MCC's Gender Policy requires that gender considerations are integrated into the development and design of programs, the assessment and implementation of projects, the monitoring of program results, and the evaluation of program impacts. The BA should include an explicit discussion of the extent to which gender differences are expected to arise in the likely distribution of benefits from each project. Such analyses, however, often require intra-household consumption data that are not available and are difficult and expensive to acquire. Given finite resources and practical realities, this guidance seeks to establish a framework for identifying the highest priorities for gender-disaggregated beneficiary analyses.

Gender-disaggregated beneficiary analysis should follow these guidelines:

- ★ Consider the expected pattern of program participation or use of improved services by sex. When programs appear to exclude women in participation or use, concerns are merited, and some formal consideration of the possible intra-household dynamics is warranted.
- ★ Investigate whether intra-household dynamics are likely to result in adverse impacts of a project on women, children, or disadvantaged groups.

Where this analysis or other evidence collected during due diligence raises serious concerns regarding an activity's adverse impact on the welfare of either men or women, these should be addressed as a normal part of MCC's pre-investment assessment and would be resolved through modifications of the program design. For targeted projects, analysis should always consider possible gender differences in the use of services affected by the project, and compare participation or use among men and women relative to their proportion in the relevant population. Not all projects need to have equal participation by men and women (indeed, some project designs offer compelling reasons for exclusively targeting one sex, such as health programs directed at pregnant or lactating women), but every project must include an explicit consideration of participation and the incidence of benefits by sex.

C.5.2. Disaggregation by Other Characteristics

Projects may also vary in their effects across other demographic and geographic groupings, such as education level, ethnicity, household size and type (e.g., single-female head, elderly head, two-parent head), and region (rural or urban). The BA should identify where such differences are expected to arise and whether their magnitudes are expected to be significant. In particular, when project effects vary widely across such groups, the analysis should note these differences, explain their sources, and note any project design elements that have been included to address these differences.

D. Respective Roles and Responsibilities

D.1. Partner Country Responsibility

The MCA-eligible country has the primary responsibility for quantifying the economic rates of return, conducting a beneficiary analysis, and incorporating expected incremental changes in beneficiary incomes as targets within an M&E plan. Net improvements in income levels and participation and benefit incidence by poverty category should be estimated based on the anticipated outputs and outcomes of individual program projects. Participation rates tabulated by gender and other important characteristics should also be estimated.

D.2. MCC Responsibility

Following the submission of the country concept papers, MCC will review these estimates of economic rates of return and beneficiary analysis. In the course of this process, the MCC will work with partner countries to help

identify and assess possible alternatives to proposed projects, including modifications or complements that would enhance the program's impacts on growth and poverty reduction. MCC may also refine ERRs based on new evidence, including that generated by relevant MCC experience elsewhere, and may supplement the BA using further analysis of the survey datasets highlighted by the partner country.

ANNEX 1

This section provides examples of economic rate of return analyses for health and education projects, showing how the cash-flow analysis could be organized for such programs.¹⁷

The first example is an education program in Mexico that offered cash assistance to poor families in exchange for higher school attendance.¹⁸ Payments were offered to families that kept their children in schools. These payments depended on the age and gender of the child, with higher payments for high school children and higher payments for girls. A study of this program, described in Morley and Coady (2003, p. 72), estimated that the program spent about 8,200 pesos per child to increase annual income by approximately 1000 pesos. Since the working life of a child is longer than the period over which payments are given, this program could be justified economically.

To see this, we have summarized the economic case for this program in a cash flow analysis in Table 1. As can be seen in the “cost per child” row of the table, the program would spend 787 pesos per child when children were 9 years old, 898 the next year and further amounts in subsequent years. The net cash transfer to the family in the first two years would be 669 pesos and 763 pesos (after deducting 15 percent for administrative costs). These administrative costs can vary substantially, so specific attention should be paid to their accurate estimation.¹⁹ Drawing on rigorous evaluations of the impact of this program on educational attainment, studies have shown that this amount of spending is sufficient to raise the education attainment by two-thirds of a year by the time the child enters the labor force. Drawing further on studies on the returns to education in Mexico, Morley and Coady (2003) estimate that this will raise earnings by approximately 1,000 pesos per year over the working lifetime. In Table 1, we have shown the additional income of the child during the first three years of working life, corresponding to ages 16–18. The rest of the table, covering the rest of the working life, is not shown to save space.

The benefits of this program include the 1,000 pesos per year in additional incomes plus the net cash transfers to the families. The costs are of course the annual costs of the program. Table 1 shows that such a program would have an economic rate of return of 20 percent over ten years and 33 percent over 20 years. While each of the specific numbers in this table could be refined, the table establishes the basic point that this kind of education program can achieve positive economic returns. Again, this table is only illustrative. Similar CCT programs could yield unacceptably low ERRs if their administrative costs are substantially higher or if their effectiveness at improving enrollments rates is lower, and these variables are highly context specific. Moreover, an increasing number

17 The presentation of these examples does not suggest necessarily that MCC approves of these projects. Some of the numbers used are estimates for purposes of illustration. Some numbers are deliberate simplifications of a more complex reality.

18 The program is named Progresa and has been extensively studied and documented. For an account that summarizes a lot of the results and research, see Morley, Samuel and David Coady, “From Social Assistance to Social Development: Targeted Education Subsidies in Developing Countries. Center for Global Development, Washington DC, September 2003.

19 For example, Caldes and Maluccio (2005) estimate that the annual administration costs of previous conditional cash transfer programs have been as high as 60% of the transfer amounts.

of studies devoted to CCTs suggest that impacts on longer-term educational outcomes, such as performance on educational tests, may be more moderate than those on enrollments.²⁰

The second example is a health program to address iron deficiency. Recent studies have shown evidence that Iron Deficient Anemia (IDA) is associated with greater susceptibility to disease, and contributes to reduced aerobic capacity and endurance.²¹ Health programs in China and Vietnam added iron supplements to sauces that are common in the diet. Further studies suggest that economic output and incomes can be raised significantly by supplementing diets in this way.

To provide an example of how to calculate the ERR for such programs, we rely on a recent rigorous study that suggested that incomes could be raised by an average of \$40 per person per year by providing supplements that cost an average of \$6 per person. Only a fraction of the people in any community is iron deficient, but because it is expensive to identify them and because it is hard to change the behavior of only selected populations furthermore, the most cost-effective strategy is often to treat the entire community.

To show a concrete example, consider Table 2, and imagine that there are 20,000 persons in a community and that 30 percent of them are iron-deficient. For these people, income will be raised by \$40 with the dietary supplement program, but the health of the other 70 percent will be unaffected. Assume further that it will take seven years for the full productivity and health impact of the program to take effect. The cost of the program would be \$120,000 per year for seven years (treating all 20,000 at \$6 per person). As for the benefits (in the form of a rise in incomes), by year 7, 30 percent of the 20,000 will obtain an additional \$40 in income for a total benefit of \$240,000. For the early years before year 7, it is assumed that $\frac{1}{7}$ of these benefits will be realized in the first year, $\frac{2}{7}$ in the second year and so forth. It is assumed that iron supplements must be provided every year.

Table 2 shows that net benefits for this program turn positive as early as year 4, and have an ERR of 34 percent over 10 years. The ERR over 20 years is 40 percent. These returns are sensitive to the fraction of the population that is iron deficient. If this fraction were 40 percent rather than 30 percent, the ERR would rise to 59 and 62 percent.

The third example is from a combined health and education project that offered de-worming drug treatment to children in Kenya.²² Rigorous evaluations indicated that this program increased school attendance by approximately 0.15 years for every year a child was treated. Further research by Knight and Sabot (1990) suggests that an additional year of schooling generates a rate of return of approximately 7 percent in terms of individual wages in future years.

20 For a detailed survey of CCT studies, see Fiszbein, Ariel et al, "Conditional Cash Transfers," World Bank Policy Research Report, 2009.

21 See Thomas, Duncan, "Health, Nutrition, and Economic Prosperity: A Microeconomic Perspective", Commission on Macroeconomics and Health Working Paper No. WGI: 7 May 2001.

22 Kremer, Michael and Edward Miguel, "Worms: Education and Health Externalities in Kenya" Poverty Action Lab Working Paper No. 6, September 2001.

The best way to calculate the economic returns of such a program would be to collect information on earnings of adults in the area under consideration. Short of this, however, we can still show some approximate figures. GDP per worker in Kenya is \$570. If 60 percent of this is wages and rural wages are 80 percent of the national average, an estimate of the rural adult wage would be \$273.6.

The de-worming treatment costs 49 cents per child per year. In Table 3, we have shown an example where such treatment is offered to a child every year in school between age 7 and 14. Using the 0.15 figure above, these eight years of treatment would mean that the child would gain the equivalent of slightly more than a year of education by age 14 when he or she enters the labor market (0.15 times eight years of treatment equals 1.2 years of education). Using the estimated seven percent figure for the returns to education, this would translate into an additional \$22.33 in earnings by the time the child becomes a fully productive working adult (assumed here to happen by age 20). Before age 20 we have assumed that the child would earn only part of this premium.

Altogether this program would have an economic rate of return of 46 percent. This high return is driven by the fact that at 49 cents per child, the cost of the program is low relative to the additional earnings that a child could earn from additional school attendance. Of course, all of these estimates could be investigated further and refined. To achieve such a low cost per child, the program may have to be administered on a large scale. But with a large increase in the supply of educated children, the return to education might well be lower than estimated here.

These examples are given, not to recommend specific programs, but rather to illustrate how ERR calculations could be done for health and education programs and to establish that the ERR framework is not biased against social investments like health and education projects.

Table 1: Conditional Cash Transfer for Education Program

Year	1	2	3	4	5	6	7	8	...	20
Age of Child	9	10	11	12	13	14	15	16	...	28
Cost per Child	-787	-898	-1,154	-947	-1,380	-1,446	-1,563			
Administrative costs per Child	118	135	173	142	207	217	234			
Cash Transfer to Child's Family	669	763	981	805	1,173	1,229	1,329			
Additional Earnings from Increased Education								1,000	...	1,000
Benefits	669	763	981	805	1,173	1,229	1,329	1,000	...	1,000
Costs	-787	-898	-1,154	-947	-1,380	-1,446	-1,563	0	...	0
Net Cash Flow	-118	-135	-173	-142	-207	-217	-234	1,000	...	1,000
Economic Rate of Return (10 years)	20%									
Economic Rate of Return (20 years)	33%									

Table 2 Iron Deficiency Program

Population	20,000										
Cost per person of Iron Supplements	\$6										
Percent of the population deficient	30%										
Increase in income from reduction in iron deficiency	\$40										
Years to reach maximum	7										
Year	1	2	3	4	5	6	7	8	9	10	
Cost	\$120,000	\$120,000	\$120,000	\$120,000	\$120,000	\$120,000	\$120,000	\$120,000	\$120,000	\$120,000	
Increase in incomes	\$34,286	\$68,571	\$102,857	\$137,143	\$171,429	\$205,714	\$240,000	\$240,000	\$240,000	\$240,000	
Net Cash flow	-\$85,714	-\$51,429	-\$17,143	\$17,143	\$51,429	\$85,714	\$120,000	\$120,000	\$240,000	\$240,000	
ERR (10 years)	34%										
ERR (20 years)	40%										

ANNEX 2, TABLE 4: Preliminary Beneficiary Analysis example

Hypothetical Farmer Training Program

This hypothetical farmer training program involves an investment of \$20 million focused on raising profits per hectare among trained farmers by 10%. Ten thousand farmers are expected to enroll in the training program; 80% of these trainees are expected to eventually adopt the improved farming practices. Each of the farmers adopting the improved practices is likely to gain \$2,851 over the ensuing 20 years. The gains will be shared by the other members in the households of these farmers, providing an average of \$570 to these 40,000 beneficiaries.

Fifty percent of the farmers in the program are considered “poor” (of which one fifth are “extremely poor”), while 25% are “near-poor” and 25% are “not poor.” Farmers apply the practices in which they are trained across their plots. Because poor farmers typically have smaller farms, they are likely to realize fewer benefits from the training. Such a program may still yield sufficient average benefits across the array of trainees to justify its cost; nonetheless, poor farmers will only realize \$0.16 of benefits for every dollar invested in the program.

Program Details					
Total Cost	\$20 mil.				
Number of farmers trained	10,000				
% of trainees adopting trained practices	80%				
Number of farmers adopting trained practices	8,000				
Average household size	5				
Total beneficiaries	40,000				
Poverty Distribution of Trainees					
% of trainees, extremely poor	10%				
% of trainees, poor	50%				
% of trainees, near poor	25%				
% of trainees, not poor	25%				
Costs and Benefits per Farmer					
Training costs	\$ 2,000				
Benefits					
Initial annual profit per hectare	\$ 1,000				
Increase in profit per hectare (%)	10%				

Average farm size, extremely poor (ha)	0.5				
Average farm size, poor (ha)	1				
Average farm size, near poor (ha)	2				
Average farm size, not poor (ha)	10				
Year	1	2	3	...	20
Benefits, extremely poor		\$ 48	\$ 48	\$ 48	\$ 48
Benefits, poor		\$ 96	\$ 96	\$ 96	\$ 96
Benefits, near poor		\$ 192	\$ 192	\$ 192	\$ 192
Benefits, not poor		\$ 960	\$ 960	\$ 960	\$ 960
Average Benefits		\$ 336	\$ 336	\$ 336	\$ 336
Average Net Benefits	\$ (2,000)	\$ 336	\$ 336	\$ 336	\$ 336
ERR	16%				

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Total Costs and Benefits	
Present Value of Total Project Benefits	
PV of Benefits, extremely poor	\$321,213
PV of Benefits, poor	\$3,212,129
PV of Benefits, near poor	\$3,212,129
PV of Benefits, not poor	\$16,060,647
Present Value of Total Project Benefits Per Beneficiary	
PV of Benefits / Farmer Adopting Practices	\$ 2,851
PV of Benefits / Beneficiary	\$ 570
PV of Benefits / Beneficiary, extremely poor	\$ 80
PV of Benefits / Beneficiary, poor	\$ 161
PV of Benefits / Beneficiary, near poor	\$ 321
PV of Benefits / Beneficiary, not poor	\$ 1,606
Cost Effectiveness: Project Benefits / Total Cost	
Total Project Benefits / Total Cost	\$ 1.12
Project Benefits / Total Cost, extremely poor	\$ 0.02
Project Benefits / Total Cost, poor	\$ 0.16
Project Benefits / Total Cost, near poor	\$ 0.16
Project Benefits / Total Cost, not poor	\$ 0.80

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Participation Rates by Gender

% of trainees who are female	25%
% of trainees, female-headed households	20%
% of farming households in the region headed by women	15%
Average farm size, female-headed households (ha)	1